Mushroom Collecting in Tanzania and Hunan (Southern China): Inherited Wisdom and Folklore of Two Different Cultures 11

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Introduction

Tanzania in tropical Africa and Hunan in subtropical China both have more than half their area under forest or woodland. Both have a monsoon climate with distinct rainy seasons during which a large yield of mushrooms appears. In 1990–1999, ethnomycological field research was carried out during four visits to Tanzania (Fig. 11.1) and one to Hunan (Fig. 11.2). In both areas, outlying villages were visited, local people were accompanied to collect mushrooms, and the food prepared and eaten with them. The vernacular names and uses for the various species were also obtained. In addition, the mushroom pickers were interviewed with the help of interpreters using standard questions. When the study started very little had been written about mushroom use in Tanzania (Eichelbaum, 1906) although a large publication on the identification of East Africa agarics existed (Pegler, 1977). Currently, more and more research on the edibility of mushrooms is accumulating from neighbouring countries (e.g. Buyck, 1994; Ryvarden *et al.*, 1994) and a survey of the literature on edible and poisonous fungi of Africa south of the Sahara has now been produced (Rammeloo and Walleyn, 1993; Walleyn and Rammeloo, 1994). In China there is a long written history about eating and cultivating fungi, and their medical uses (e.g. Ying *et al.*, 1987) and a large work on the fungi of China has been published in English (Teng, 1996), and a volume on the macrofungi of Hunan in Chinese (Li *et al.*, 1993).

In neither area visited had the village people seen any mushroom identification book, so the author was able to collect local and ethnically spoken information. When the first excursion to Tanzania was planned, it was thought that

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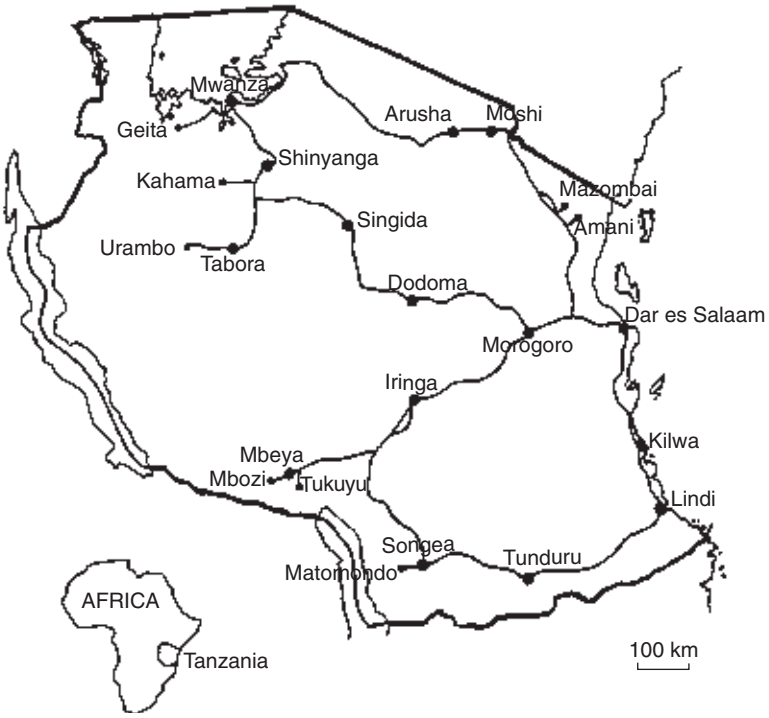

Fig. 11.1. A map of Tanzania showing the itinerary of the four collecting trips.

travelling on the frontier roads during the rainy season and communication with people of 120 vernacular languages would be the most difficult part of the survey. However, such difficulties were surmounted with the help of Leonard Mwasumbi from Dar es Salaam University. More difficult was the identification of specimens, since Tanzanians eat, and even sell in market places, mushrooms not yet scientifically described. Most of the fungal specimens collected in Tanzania currently still await identification, but the most important results concerning useful mushrooms have been published (Härkönen, 1992, 1995; Härkönen *et al.*, 1993a,b,c; 1994a, b,c; 1995; Saarimäki *et al.*, 1994; Calonge *et al.*, 1997; Karhula *et al.*, 1998). On each trip slime moulds were also collected and the number of myxomycetes reported from Tanzania now comprises 120 identified species (Härkönen and Saarimäki, 1991; 1992; Ukkola and Härkönen, 1996; Ukkola *et al.*, 1996; Ukkola, 1998a,b,c). Most of the myxomycetes collected in China have been identified, increasing the number of known species of Hunan from 14 to 77, but most of the macrofungi have been identified only to genera. For the future research plan see Härkönen (2000).

The results compiled from 100 interviews in Tanzania with people of 35 tribes, and from seven interviews with Chinese in Hunan are outlined below

Fig. 11.2. A map of Hunan showing the research areas visited in 1999 and 2000.

with the questions asked. Some small additions were made to reflect preliminary results from the second field trip to China in September 2000.

1. Do you eat mushrooms?

In Hunan everybody used mushrooms for food. In Tanzania there were large differences between tribes. The Chagga, Arusha, Meru and Maasai, for example, would not put a mushroom in their mouths, but the majority of people liked them very much. The attitude was uniform within specific tribes.

2. Who in your family collects mushrooms?

In Tanzania women and children went out mushroom hunting, but the men might bring mushrooms home if they happened to see them. In contrast, informants in Hunan said that the picking of mushrooms interested men more than women.

3. Who taught you about collecting mushrooms?

In both cultures mushroom knowledge was handed down orally from one generation to another. The most knowledgeable were elderly country people (women in Tanzania) whose families had lived in the same area for generations.

Educated people had forgotten almost everything about wild mushrooms. Vernacular mushroom lore was not taught at school and was attributed to the life of primitive food gatherers. Many urbanized Tanzanians, however, remembered with enthusiasm how as small children they used to keep an eye out for mushrooms during such activities as tending cattle, and the Chinese were ready to pay much more for wild mushrooms than for cultivated ones.

4. How many different species do you collect for food?

In Tanzania the selection of edible species was small in mountainous areas and large in miombo woodland; the highest number of species listed by one person was 28. In China only mountain areas were visited and the highest number of mushrooms counted by one man in Badakongshan was 33 species. In Zhangjiajie in Hunan only the most delicious species were collected, because it was hard work and services to the tourist industry were considered more rewarding. One method of identifying whether a *Russula* is edible is to blow on the fruit body; if the gills whistle then the fungus is considered delicious (Fig. 11.3).

5. Please list the names of mushrooms presented

The vernacular names in both areas varied greatly. The largest number, 22, was for *Termitomyces letestui* (Pat.) Heim. in Tanzania. Also, in Hunan the vernacular names for certain mushrooms were different in the three research areas visited and also differed from the names in a Chinese mushroom guide-book (Ying *et al.*, 1988; Huang 1998) with the exception of commonly cultivated mushrooms; for example, *Auricularia auricula* (Hook) Underwood and *Lentinula* (*Lentinus*) *edodes* (Berk.) Sing., whose Chinese names refer to wood's ear and fragrant mushroom respectively. The vernacular names in both cultures are illogical in the sense of scientific classification and referred to such features as colour, form, substrate, habitat or taste. For instance, all the species growing on banana litter might have a common name and, by use of compound words, species unrelated to each other might be classified in a common group. In Hunan the lichen *Umbilicaria esculenta* (Miyoshi) Minks was combined with the basidiomycete *A. auricula* through their names *Yan-er* (the ear of a rock) and *Mu-er* (the ear of wood).

6. Which species tastes best?

In this connection the informants were also asked to classify the mushrooms according to their palatability into three categories: *** delicious, ** good, * just edible. From a summary of the answers it was obvious that in Tanzania species of *Termitomyces* (Fig. 11.4) were considered the best. *T. letestui* (Pat.) Heim, *T. eurrhizus* (Berk.) Heim, *T. microcarpus* (Berk. & Br.) Heim and *T. singidensis* Saarim. & Härk. all received an average ranking of three points.

Fig. 11.3. In Hunan one way of testing whether a specimen of *Russula* is edible is to blow on its gills. This example 'whistled', so it is good for food.

There are many species of chantarelle in Tanzania, yellow, red, black and even bicoloured, and in the author's experience all were considered edible and at least two, *Cantharellus isabellinus* Heinem. and *Cantharellus platyphyllus* Heinem. as delicious.

Many species of *Amanita*, both with and without a ring, were collected for food, but only *Amanita loosii* Beeli (in our mushroom-guide, Härkönen *et al.*, 1995, with synonym *Amanita zambiana*; see Walleyn and Verbeken, 1998) received the highest praise (Fig. 11.5).

Numerous species of *Russula* and *Lactarius* occurred in the miombo woodlands and also in the mountains of Tanzania. In the mountainous area people tended to reject them, but in the miombo area some were considered edible and others non-edible. There was no apparent rule for judging edibility. They broke

Fig. 11.4. In Tanzania, specimens of *Termitomyces* are dug up with a stick to get all the pseudorrhiza. This *T. singidensis* grew in badly degraded, former woodland.

a fruit body, smelt it and had a taste and then said if it was edible or not. Among the rejected and accepted ones were both acrid and mild species. I personally tasted every specimen before preparing them for herbarium collections and, according to long experience, found that far fewer acrid species occurred in miombo woodland than in the boreal forests of northern Europe. As in my home country, Finland, the acrid species were made milder by pre-boiling them before cooking (Härkönen, 1998). Among very mild 'three-point' *Lactarius* species were: *L. cabansus* Pegler & Piearce, *L. edulis* Verbeken & Buyck, *L. xerampelinus* Karhula & Verbeken, and *L. volemoides* Karhula, which is so mild and pleasant that hunters may eat it raw in the field. Among the highest quality *Russula* species were *R. cellulata* Buyck, and *R. ciliata* Buyck. Other genera including

Fig. 11.5. Among the several edible species of *Amanita* in Tanzania, *A. loosii* is the most praised one.

species considered edible by some tribes were: *Armillaria*, *Auricularia*, *Coprinus*, *Macrolepiota*, *Pleurotus*, *Polyporus*, *Volvariella* and some ramarioid fungi. It can be generalized that people living in mountainous areas preferred wood-inhabiting fungi, and those living in miombo woodlands preferred mycorrhizal fungi, but in both areas *Termitomyces* were most valued. Most tribes considered species of *Agaricus* poisonous, although some informants knew that white people like them. With regard to boletes, Tanzanians said that even monkeys do not eat them. Although boletes are very common in miombo woodlands, we found a bolete only once, a specimen of *Strobilomyces* from the mushroom basket of a woman, and she said that it had to be boiled before cooking.

In Hunan the most appreciated 'mushroom' shown was a lichen, *Umbilicaria esculenta*, also used in Japan and Korea (Wei, 1991). It was collected from the very steep rocks in Zhangjiajie and sold in market-places at the high price of 160 yuan kg^{-1}; the other wild fresh mushrooms cost about 2–40 yuan kg^{-1}, with cultivated ones being still cheaper. In a first-class restaurant in Changsha, food made of *Ramalina* sp. and *Lobaria* sp. was also available. In the author's opinion, all three dishes were tasty.

Other species whose taste was evaluated with three 'points' by some of our Chinese informants were boletes or belonged to the genera *Pleurotus*, *Lentinus*, *Auricularia*, *Ramaria*, *Lactarius*, *Russula*, and *Amanita*. During the visit there was a good yield of the genus *Lactarius*. The species belonging to the *Lactarius deliciosus* group were most popular and sold under the common name *Tsong-jun* (meaning growing-under-pine). Mieke Verbeken (Ghent, Belgium, personal communication) has identified one of the specimens as the recently described

Lactarius subindico Verbeken & Horak (Verbeken and Horak, 2000). From preliminary identification they also included *Lactarius hatsudake* Tanaka and *L. akahatsu* Tanaka, species which are traditionally used as commercial mushrooms in Japan (Tanaka, 1890; Imazeki *et al.*, 1988). The informants preferred the bluish and greenish varieties of *Tsong-jun* (Fig. 11.6) to the orange one (*L. akahatsu*).

It was curious to a Western consumer that both Tanzanian and Chinese people eat tough, leathery species of polypores and also the rather insignificant *Schizophyllum commune* Fr. Several species of *Auricularia* have been used and also cultivated since antiquity in China and elsewhere in eastern Asia (Chandra, 1989). Most Tanzanians do not use *Auricularia* but, for instance, in the Usambara mountains they are popular and the author has recorded their

Fig. 11.6. In Hunan men like to go mushroom-hunting. Here specimens of *Lactarius* have been collected.

descriptive Swahili name *Uyoga Hindi* (= mushroom of Hindu) referring to Asia. Both *Schizophyllum* and species of *Auricularia* are considered health-promoting in China.

7. Is everyone here allowed to collect mushrooms everywhere?

In both countries there were no restrictions on collecting wild mushrooms even from other owners' plantations.

8. When and how often are the mushrooms collected?

In the Tanzanian countryside during the rainy seasons mushrooms could be collected every day. Mushroom forays were usually made early in the morning, because there was competition for the best varieties. In Hunan there were two fruiting seasons, in (March) April–June and August–September (October), but families did not go regularly to pick mushrooms because cultivated mushrooms were available throughout the year.

9. How do people prepare mushrooms for food?

In Tanzania the kitchen in the countryside was very simple and all the food was prepared on open fires between three stones. The mushrooms were washed and cut into pieces and cooked in water or oil in a kettle. Peeled onions and tomatoes were added, and sometimes also wild or cultivated vegetables but seldom with any other spices or seasonings except salt. The food was cooked for so long that the tomatoes and onions formed a thickened stew which was eaten with ugali (a type of maize-porridge), rice, cassava or cooking-bananas.

The Chinese kitchen was well equipped and had a large stove with big shallow pans. In Hunan they also began by washing the mushrooms and cutting them into pieces. Some wild species were parboiled before cooking and some less knowledgeable people pre-boiled all the wild species just for safety's sake. Usually the preparation of mushrooms began by frying some ginger and hot pepper in oil in the pan before adding the mushrooms. Then some meat such as chicken or fresh or smoked pork was added to the pan. Before taking it to the table some cooked vegetables might have been added to the serving dish. At the same meal there might be more than one dish of fungi, and the hot pot in the middle of the table often consisted of mushroom soup.

10. Who in your family prepares mushrooms for food?

That was an inappropriate question in Tanzania, because in that African society the mother always prepares the food. In Hunan men and/or women prepare food and some of the male informants said that they themselves always collected and prepared the wild mushrooms.

11. How highly do you value mushrooms as food compared with other foodstuffs such as meat, fish or vegetables?

This again was a foolish question in Hunan, because people like all those foods and usually have all of them during the same meal at least during feasting. In Tanzania most people value mushrooms very highly and, especially at the beginning of the rainy season, they are preferred to any other kind of food. The mushrooms appear just at the right time at the beginning of the rainy season when the crops of cultivated food from the previous season are almost finished and new crops have only just been planted. As food, Tanzanians consider mushrooms to be similar to meat, particularly chicken.

12. Do you preserve mushrooms?

In both areas drying was the typical method of preserving the mushrooms. In Tanzania in the miombo area there are some sunny days even during the rainy season. The mushrooms were cut into pieces and spread on a mat or an iron sheet. Some specimens of *Lactarius* were pre-boiled before drying and became very hard. The tropical sunshine is a quick dryer. However, when dried Tanzanian mushrooms were analysed in the Technical Research Centre in Finland, specimens were not considered microbiologically satisfactory for human consumption. In Hunan, dryers with sieved shelves heated from the bottom were used, and the result was excellent when estimated by eye. Wild mushrooms were mostly used only when fresh. In Daweishan where the relative humidity was above 83% the dried mushroom were also smoked after drying to prevent spoilage during storage.

13. Are mushrooms sold in the market-places in this region?

In Tanzania mushrooms are sold, fresh or dried, in market-places and on roadsides, for example, specimens of *Termitomyces*, *Cantharellus*, *Lactarius*, *Russula* and *Amanita*. Sometimes the identification appeared to be the responsibility of the buyer; we have found the poisonous *Chlorophyllum molybdites* (Meyer:Fr.) Massee among the varieties offered for sale.

In short visits to the market-places in Hunan, in addition to the cultivated *Auricularia* and *Lentinus*, only species of *Lactarius* and the lichen *U. esculenta* were seen being offered for sale. In Tanzania, mushrooms were not cultivated, but in the sisal estates visited, people came daily to collect specimens of *Coprinus* growing on composts of sisal-processing factories. In both countries the price paid for mushrooms was rather high compared, for example, with fruit or vegetables.

14. Do you use mushrooms for purposes other than for food, for instance as medicine?

In Tanzania information on medicinal use of mushrooms was scarce. In several villages mushrooms were given to mothers after childbirth to promote recovery. *T. eurrhizus* was also used mixed with some herbs as a cream for skin diseases, and *A. loosii* was considered to be a cure for stomach problems. Information on the ancient use of *T. letestui* to cure bilharzia was obtained, and a young man who collected the pseudorhizas of that species for a traditional healer was encountered, but he did not know for what purpose it was used. Luguru people used *Auricularia* species for removing ear wax. The fruit body was warmed by a fire and the jelly-like content was pressed into the ear. The wax could then be removed from the ear. Species of hard polypores, including *Ganoderma* were used widely for such problems as toothache, coughs and animal diseases. In several places puffballs were used to sedate bees. A puffball was attached to a stick and set on fire. It produced a lot of smoke and could be taken on the stick to sedate a hive of bees.

In China the use of fungi for medicine has a long history. The earliest book on medical substances in China from the 1st century BC included fungi, and a modern book on medicinal fungi included descriptions of as many as 272 fungal species (Ying *et al.*, 1987). Mushrooms are used not only to cure diseases, but their regular use as food is also considered to provide a healthy and balanced diet. So the functional foods which have become so fashionable in Western countries have been used since antiquity in China. Modern Chinese pharmacological research has discovered more and more substances in fungi which promote health and cure diseases such as sarcoma, carcinoma and hepatitis. Most informants, however, used mushrooms only for food. They considered mushrooms to be health-promoting, and it was customary to bring mushrooms as a present when visiting friends.

15. Is there a traditional healer in your village who uses mushrooms? How are they used?

Some traditional healers met in Tanzania were friendly but not willing to describe their medicines. Such matters were secret, since the medicines lose their power if their composition is known to outsiders.

In China the opposite situation occurred. In Badagongshan the local herbalist, Tao Jie-wen, presented several specimens and proudly said how and for what purpose these medicinal fungi were used. Several species of polypores were used; for instance *Polyporus tubaeformis* (P. Karst.) Ryvarden & Gilb. could be used against headaches. It was cleaned, dried and powdered, and the pow-

der was mixed with water and drunk. It is also good for digestion, when washed, dried, powdered and diluted with alcohol or warm water. Some species of *Phellinus*, e.g. *Phellinus baumii* Pil., were powdered and mixed with vegetable oil to use against skin diseases such as scabs and small wounds, or the powder was placed directly on to the skin. *Fomes fomentarius* (L.: Fr.) Fr. was used against kidney disease. It was soaked in alcohol or used with other medicines. Food prepared with *Auricularia* is good for the digestion. He also brought out long, white, string-like mycelial cords, collected from vegetation in the forest and used against hepatic cirrhosis. It was chewed as it was or used with other medicaments. Some white radial mycelial fans on wood were used against neurasthenia. The mycelium was eaten raw and alcohol drunk with it. The medicine-man also presented several specimens of lichens used for medical purposes such as healing of wounds or burned skin.

Considered best of all medical fungi in China is *Ganoderma lucidum* (M.A. Curtis: Fr.) P. Karsten. It has been said to cure almost every ailment; for example headache, sleeplessness, poor appetite, 'womens' troubles' and depression. It is used diluted in water like tea, or with alcohol. In addition, it brings good luck. The Chinese have learned how to cultivate *Ganoderma* and it was offered for sale in shops and markets, for instance in the Zhanjiajie Nature Reserve. Needless to say the wild specimens were considered much more potent and were more expensive than the cultivated. The bigger and more branched the fruit body the more desired it was. In Zangjiajie, a man who had found an enormous fruit body of peculiar shape earned his living by showing it to tourists.

In Tanzania some peculiar fungi were used as amulets. For instance, near Mbeya a young man was seen carrying a hard fruit body of a tall *Xylaria*. When he met his enemy he just had to take it from his pocket and scratch his head with it, and all antagonism was forgotten!

16. Are there poisonous mushrooms in this region?

In both countries people were very well aware of the existence of poisonous mushrooms.

17. Have misidentifications occurred, leading to mushroom poisonings?

Mushroom poisonings, even fatal ones, were reported in both countries. In Tanzania mushroom poisonings for the purpose of killing, for instance an undesirable daughter-in-law, were recalled.

18. How do you recognize a poisonous mushroom?

In general, in both countries informants seemed to be uninterested in knowing or naming the poisonous species. A collective name was used for them. When asked, some tried to describe some general characters of poisonous species. In Tanzania, there was a common belief that if the gills of the fungus turn dark, as in the genus *Agaricus*, the species is very poisonous. In China it was believed that all the species with bright colours (e.g. *Aseroë rubra* Labill., *Calostoma cinnabarina* Desv. and *Dictyophora multicolor* Berk & Br.) are poisonous. In Daweishan the following dangerous rule was used for unknown pleasant-looking mushrooms: collect some sprouts of *Juncus decipiens* and peel their base. Put the peeled bases in boiling water with mushrooms. If they change colour, the mushrooms are poisonous. Most people in both countries realized that poisonous mushrooms have no common character. Mushroom poisoning was avoided by carefully identifying the edible ones as taught by their parents. That was commendable, but a double check would add to safety and people should be taught what the most dangerous mushrooms look like; indeed there is a popularized guide on poisonous mushrooms available in China (Anonymous, 1988). Both in China and in Tanzania plantations of exotic trees are common. Mycorrhizal mushroom species unknown to the inhabitants might be brought into the area with the tree seedlings. This must have happened in the monotonous plantations of *Pinus patula* in Mufindi and Mafinga in 1994, where the needle layers of the plantations were full of red fly agaric, *Amanita muscaria* (L.: Fr.) Hooker, common in Europe and Asia but not indigenous to tropical Africa. In a local hospital some victims of mushroom poisoning by that species verified that they had thought they had consumed a tasty edible red *Amanita*, *A. tanzanica* Häk. & Saarim., *Wigwingwi* in Hehe language (Fig. 11.7). The symptoms of strong hallucinations were typical of *A. muscaria* (Fig. 11.8), leading to the unexpected death of one of the victims.

19. Do you know any beliefs, stories or fairytales about mushrooms?

In Tanzania several stories and even songs about mushrooms have been collected (see Härkönen *et al.*, 1995). Some are nice fables, some are mythical ideas about the powers of some mushroom species and some have an ecological moral. In Hunan only some were heard; one is as follows. In the autumn a wounded crane flew towards the south and its blood was dropping into a pine forest. From this blood *Tsong-jun* (*L. hatsudake*) with reddish latex milk grew. The other story was connected to a vary rare mushroom *Jiangnü-Jun* which grew from the tears of a beautiful woman, Jiangnü, who wept desperately because her husband was taken for years to build the Great Wall of China.

Fig. 11.7. In Tanzania the indigenous *Amanita tanzanica* is a good edible mushroom.

Discussion

When collecting vernacular information on the use of mushrooms in the frontier areas of Tanzania and Hunan, the richness of orally inherited knowledge was seen, and the surface of it has only been scratched. Let us hope that more people, and especially indigenous mycologists, will direct their enthusiasm to the field of ethnomycology. It would be valuable ecologically, economically and culturally. But there needs to be haste, because urbanization and the modern way of living results in societies forgetting their long oral traditions.

Fig. 11.8. The introduced *Amanita muscaria* resembles *Amanita tanzanica*, especially when it loses the white spots of its cap as the fruit-bodies push through the needle-cover under exotic pines, so causing misidentification and poisoning.

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